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ABSTRACT

This booklet presents an analysis of the range of options open to educational planners in designing educational programs to serve major developmental and social goals. In his discussion, the author attempts to balance the theoretical with the practical dimensions of development administration. He focuses in turn on decisions related to technological design (first-order decisions), decisions involving choices among institutional functions (second-order decisions), and decisions that create incentives and motivate personnel (third-order decisions). Immediately following the discussion of each order of decision is an appendix that presents short illustrative case studies drawn from the literature on educational development. (Author/JG)

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Alternatives and decisions in educational planning

John D. Montgomery

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Alternatives and decisions in educational planning

John D. Montgomery

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Fundamentals of educational planning

The booklets in this series are written primarily for two types of clientèle: those engaged in—or preparing for—educational planning and administration, especially in developing countries; and others, less specialized, such as senior government officials and policy-makers who seek a more general understanding of educational planning and of how it is related to overall national development. They are devised to be of use either for private study or in formal training programmes.

Since this series was launched in 1967 the practice as well as the concept of educational planning has undergone substantial change. Many of the assumptions which underlay earlier attempts to put some rationality into the process of educational development have been abandoned or at the very least criticized. At the same time, the scope of educational planning itself has been broadened. In addition to the formal system of schools, it now includes other important educational efforts in non-formal settings and among adults. Attention to the growth and expansion of educational systems is being supplemented and sometimes even replaced by a growing concern for the distribution of educational opportunities and benefits across different regions and across social, ethnic and sex groups. The planning, implementation and evaluation of innovations and reforms in the content and substance of education is becoming at least as important a preoccupation of educational planners and administrators as the forecasting of the size of the educational system and its output. Moreover, the planning process itself is changing, giving more attention to the implementation and evaluation of plans

as well as to their design, and exploring such possibilities as integrated planning, participatory planning, and micro-planning.

One of the purposes of these booklets is to reflect this diversity by giving different authors, coming from a wide range of backgrounds and disciplines, the opportunity to express their ideas and to communicate their experience on various aspects of changing theories and practices in educational planning.

Although the series has been carefully planned, no attempt has been made to avoid differences or even contradictions in the views expressed by the authors. The Institute itself does not wish to impose any official doctrine on any planner. Thus, while the views are the responsibility of the authors and may not always be shared by Unesco or the IIEP, they are believed to warrant attention in the international forum of ideas.

Since readers will vary so widely in their backgrounds, the authors have been given the difficult task of introducing their subjects from the beginning, explaining technical terms that may be commonplace to some but a mystery to others, and yet adhering to scholarly standards. This approach will have the advantage, we hope, of making the booklets optimally useful to every reader.

Preface

If it ever was possible to make a meaningful distinction between educational planning and educational administration, such a distinction has by now become exceedingly tenuous. The experience that there is more to educational planning than the design of educational plans, and the resulting concern with problems of plan implementation have brought 'planners' and 'administrators' closer and closer together. The policy concerns which both face are no longer limited to the mere growth and maintenance of educational systems, but have to do increasingly both with the substantive reform of educational programmes and with the geographical and social distribution of educational opportunities.

Given this much more complex framework within which planners and administrators are trying to accomplish their task, it becomes important to take a fresh look at the kinds of decisions which they are called upon to make. One of the most important aspects of such a review of decision-making in educational planning and administration lies in the relationship between the substance of the decision and the context of social change within which it is embedded and of which it has to take account.

Professor Montgomery has spent most of his professional life studying the problems of administration within the context of social change and development. The ideas which his work has generated appeared to us so fruitful that we asked him to apply them to the specific context of educational planning and administration. The result of his effort is this little book, which I hope will give educational planners and administrators around the world an opportunity

to reflect upon the nature, elements and constraints of the decision-making process in which they are involved.

Hans N. Weiler
Director, IIEP

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Introduction

Schools everywhere are easily identified for what they are. There are not many little red schoolhouses any longer, but what happens inside them is not changed very much. A classical Roman educator dismounting from a time machine set for the 1970s could recognize a classroom in almost any country in the world. He might even derive some sense of satisfaction and reinforcement from observing this common link of human endeavour from Caesar's time to our own.

There are differences, of course—differences subtler than that between our own free-form classrooms with their organized chaos and the benches and slates of ancient Rome. Those differences reflect variations in social purposes and national self-images. Roman education was not linked to social change; there was no desire to convert barbarians into Romans or to modernize the imperial subjects. Only Romans were to be citizens.

A society that seeks to change itself by changing its people is placing upon education a burden that the schoolroom alone cannot assume. In establishing schools a society is exercising its collective will. In using schooling as an instrument of development it is embarking upon new decisions that it rarely sees as a series of rational choices.

These decisions do not often occur as simple unified actions; but in their collective effects they can be examined as nodes of possible choice, points at which an on-going operation can be conceived in terms of alternatives. No one inventor decided to design an educational system involving rows of desks facing a blackboard, served by teachers who are members of a career service, and attended by pupils who must 'behave' or suffer the consequences. But if any of

these elements of our present system is to be changed drastically, the alternative choices can be considered rationally by comparing them with the original 'decisions', just as if they had once been made rationally and were now subject to review.

This monograph will suggest a way of examining those decisions. In doing so, it will depart from the educator's professional categories for considering the arts of learning and teaching. It will examine curricula, teaching methods, and learning theory, but it will do so from the standpoint of development and social change rather than that of pedagogy. The language and style used are more familiar to students of administration than to professional educators and economists, but I hope they are not offensive to them.

The range of decisions that educational planners have to make in order to accomodate social needs in the twentieth-century far transcends the subject matter of professional education. Consider, for example, the issue of vandalism, now so widespread in urban areas where students have begun to consider violence an expression of political belief. Educators can respond to this challenge in many ways: by adding burglar alarms and mechanical deterrents; by turning school surveillance over to neighbourhood associations of teachers, parents, and local officials; or by motivating students to identify their own interests more closely with those of the school. Some may even work out a judicious mixture of these three approaches.

These are three quite different types of response to vandalism—described as first-, second-, and third-order decisions in this monograph—but all lie within the competence of the educational community. As a result, educators have learned more about protection devices than they used to know, though they have been somewhat reluctant to get involved in neighbourhood organization and student participation because they touch upon social policies that seem so remote from their expertise and professionalism. But any of these approaches could reduce the problem; none deserves neglect.

Relating education to development is a more positive and still greater challenge. Knowledge is the primary ingredient for modernization in every other sector. But knowledge has to be *created*, *transmitted*, and *used* before it can benefit mankind. Education is a pre-requisite to the first, a vehicle of the second, and a guide to the third of these three functions. Educational planners are justified in choosing to concentrate on the transmission function as their

central purpose, and most of the decisions discussed in this book respect that choice. But the point of view presented here is that educators should not confine their functions to transmission alone, because no other sector has the resources to treat the three functions as a whole in the larger context of social change.

I suspect that when the International Institute for Educational Planning asked me to write this monograph, it was hoping that my concern with social change would complement the more professionally oriented approaches taken in the other books in the 'Fundamentals' series. The aim was to produce an analysis that would be comprehensible and meaningful to planners and educators, but even more so to concerned citizens and reformers. It is addressed more to ministers of education than to the careerist permanent secretaries on their staffs. Whatever credentials I bring to this task have been derived from my experience and study of development, which has led to some general perceptions of government interventions on behalf of social change that I believe need to be introduced into the context of educational planning. Readers interested in other applications of these perceptions are referred to the bibliographical notes, pages 64-66.

The structure of this monograph expresses my desire to balance the theoretical with the practical dimensions of education as aspects of development administration. After each general discussion there is a appendix consisting of short cases drawn from the published literature on educational development. The purpose is to illustrate, as thousands more words would not, how development decisions interact with educational planning.

I. The search for progress

Educators long ago resigned themselves to that fact that progress is more difficult to measure in their sector than in any other aspect of development. The extensive data gathered by international agencies have achieved some standardization in reporting quantifiable achievements, such as numbers of students enrolled at different grades, numbers of teachers trained, and numbers of buildings and classrooms constructed. The first measure of progress shows the increase in effort, however, not its effects, and it does not indicate what was left undone or who was left out. The second substitutes credentials for effectiveness; while the third can describe impressive increases in facilities without indicating how efficiently they are being used.

Attempts to measure economic returns on educational investments have deepened our understanding of these issues, but they still do not exhaust the range of considerations that educators must bear in mind as they attempt to use their resources for developmental purposes. There are output measures such as improvements in actual literacy rates that can be used and even converted to dollar values as an inducement to further investment in education; but the resultant figures are transient and, in the end, unverifiable. Similarly, increases in the numbers of engineers and doctors trained annually may mask problems of unemployment, emigration or low quality; just as knowledge tests will show improvements in pupil achievements without necessarily demonstrating their life relevance or the social value of the education received. Education is replete with measurements but short on standards.

When education is treated as a sector in development, still more

difficult questions of social policy are raised. It is tempting to dismiss these issues as unprofessional, but recent experience shows that planners and administrators, as well as teachers, can improve their efforts at many points that lie outside the formal context of education. From the disciplines of economics and accounting, educational evaluators have created statistical measures of efficiency; they have produced devices for measuring comparative ratios of effort to demand; and they have even found ways of preparing cost/benefit analyses of proposed innovations to guide their future investments. Even so, neither educational statesmen nor political leaders are satisfied that conventional or modernized programmes are serving the national needs as well as the resources would permit.

The framework of analysis proposed in the chapters that follow will permit planners to consider means for stimulating more effective performance in programme development, implementation, and use even in countries that may seem to have reached a plateau of national achievement.

II. Regenerating the system

One means of regenerating the educational sector is to re-examine the major systems of interlocking decisions that can be changed to achieve a desired effect. The three sub-systems presented in this section may never have been consciously used as frameworks for decision-making; educational planners tend to make such decisions *seriatim* and without considering alternatives that might exist at each of these points. Nor are these sub-systems of equal importance for different purposes. But they represent distinct orders or functions whose inter-relationships produce the educational system as we perceive it.

The *first*-order decisions in education are those that relate to technological designs, that is, to interactions between physical instruments of instruction and the social environment. Developing options and making choices in this arena may require participation by specialists in communications, electronics and radio, and engineering, all working in close collaboration with educators and social scientists. They are often made independently of the other decisions in this paradigm. They are not necessarily first in order of importance, but they are the easiest to conceive as separate systems.

The *second*-order decisions are those involving choices among institutional possibilities for carrying out such educational functions as planning, sustaining, teaching, and overseeing the processes of instruction. Choosing among the options requires some understanding of the work of organization theorists, sociologists, and public administrators, as well as educators. Sometimes the choice of institution foretells the choice of technology.

The *third*-order decisions are those that create the rewards and

incentives that motivate all personnel in the system. They include the incentive systems—economic and other—used to bring the best administrators into administrative positions, and to inspire the best teachers to maintain a creative and flexible enthusiasm for their teaching, as well as those that develop and retain students' commitment to learning in those fields where the national needs are greatest.

These three functions collapse, interact, and displace each other in ways to be explored in later sections. Analysing the interaction among the technological, organizational, and motivational subsystems is a task to be considered in the concluding section of this monograph.[1]

Educational systems are not always judged in terms of their formal contributions to teaching and learning alone, yet the decisions affecting even those relatively simple processes cannot be made exclusively on technical terms. Most countries have devised mechanisms for keeping educators subject to citizen review, even as they have the military. It behoves professionals in both areas to give heed to public perceptions and preferences, since their decisions may encounter strong social resistance. A searching review of technology is impossible without considering social needs and responses; or of a bureaucracy without considering non-bureaucratic institutions; or, indeed, of learning itself without considering the life-management needs of the public. Education is a process of changing the outlook of those receiving it, but it also changes those transmitting it. A thorough evaluation of education is thus an occasion for discomfort, just as knowledge itself is. Obsolete approaches are often as well established and stoutly defended in an educational system as they are in any other element of the society it is serving.

1. This three-function paradigm is not to be confused with the three decision elements taught in courses in educational planning ('aims or strategies,' 'objectives or tactics,' and 'means or logistics'). Planners may have to consider all three elements in changing any one of the functions in the educational system. A matrix could be constructed defining these decisions:

Sub-system/Plan	Aims	Objectives	Means
Technology			
Organization			
Motivation			

The process of applying these decision orders to educational planning and administration, even in retrospect, is an implied threat to conventions that have often evolved into a way of life. But to the extent that education is considered a dimension of national development, it is necessarily a challenge to convention.

III. First-order decisions

Many of the dazzling instructional technologies associated with modern education have displayed more technological than educational sophistication, leaving the social environment of education out of the equation altogether. They represent first-order decisions made quite independently of organizational and motivational issues. The technologies that appealed to educational modernizers in the 1950s and 1960s tended to be 'space-age' innovations, involving heavy capital investments and high operating costs. Sometimes the actual unit savings (calculated on the basis of cost per student/hour) were rather minor, leaving the ultimate justifications to be made in terms of educational advantages. One disconcerting but repeated finding was that the supposed economies in manpower produced by the television classrooms consisted of little more than substituting technicians for teachers when neither resource was plentiful. Worst of all, because they had usually been imposed upon an existing system, these high-technology innovations tended to remain external to it, leaving educational administrators to cope with two systems instead of one.

Critics of the 'technological fix', as these misfits are often called, usually focus on design characteristics of the specific technology chosen. They opt for cassettes instead of computers, or radio instead of TV. Evaluations of these pilot projects have generally concluded that the more modest and familiar techniques are cheaper after all, and that they produce results that compare favourably with those of the more sophisticated systems. Some societies have found renovated traditional systems—posters and blackboards—do the job as well, and more cheaply. These findings have now been widely

accepted among educators, many of whom were already sceptical of what they once called 'science-fiction technologies'. Teaching arithmetic by 'pi in the sky', as proposed a decade or so ago, has come into disrepute.

These technological criticisms should be heeded, but they do not go far enough. Most of the significant changes in educational technology in recent years have resulted from re-adjustments in the relationship between technology and society rather than from the introduction of electronic devices. More fundamental changes have come about only after educational planners and political leaders have asked questions such as the following:

1. What classroom functions are now being performed by accredited teachers that could be carried out by others?
2. What rôles now assigned to schools could be standardized sufficiently so that they could be discharged by other social institutions?
3. At what point in the life-cycle of a youth's education can the largest gain in knowledge or skill occur with the least disruption of the other processes of maturing?
4. How can the educational curriculum be arranged or rearranged to serve the needs of citizens located in different areas?

Consider how greatly some of the answers given to these four questions in different countries have changed the educational systems operating in the late 1970s:

1. Some countries are using technologies that permit teacher's aides (including parents and teen-aged school-leavers, on both a volunteer and a semi-professional basis) to serve as intermediaries, administrative assistants, graders, monitors, and, under supervision, teachers of basic skills. These substitution rôles have permitted accredited teachers to spread their efforts over much larger numbers of pupils without reducing the personal interactions that are vital to the learning process. Technologies that do not make such substitutions possible are not likely to effect savings in education.
2. Some countries are using village temples as substitutes for classrooms in teaching basic literacy; and others are assigning teaching functions to families using training materials under visiting supervisors, thus introducing formal education as a supplement to the informal learning that occurs as a normal part of family life.
3. Some countries are finding that providing four years of instruction

to children aged 10–14 or 12–16 imparts education (at least, *knowledge*) much more efficiently than that based on the 6–10 cycle, leaving children at home when parental care is most influential in their lives, and bringing school-leavers out of the system at the age when their knowledge can be put most immediately to use in the community. Such experiments show that the faster learning-cycle of older children permits them to catch up quickly with those who started earlier, so that their educational opportunities are not foreshortened in order to gain the benefits of longer participation in family life and a more immediate linking of their educational skills to social needs.

4. Some countries that have experimented with regional variations in curriculum design have found that local needs (rural versus urban, dryland versus wetland, hot versus cold climates, mining versus industrial or agricultural production) can be best suited to education in the early years. Thereafter, once the immediate community needs have been served, it is more efficient to offer training in the more general skills that are required for further education.

None of these variations can reap maximum benefit without changes in the technology of the educational process. Standardized modules of education, for example, whether brought in by cassettes, computers, radio, or television, can be most effectively used in the light of conscious decisions about the four issues described above. Thus, some combination of the improvements suggested above can be devised to accommodate local circumstances (1) where monitors are available, (2) where priests, monks, or mothers are prepared to serve an educational function in connexion with their other duties, (3) where children are old enough to maintain and operate simple equipment and are permitted to do so, and (4) where these standardized units and modules can be fitted together in a sequence that serves and re-inforces community needs and resources.

Complaints against most post-colonial educational systems focus on the 'technologic misfit' between their use of existing social resources and the national needs. These misfits are the unintended consequence of making first-order decisions in isolation. Costly educational processes, distorted expectations, and over-elaborate buildings and other facilities result from hastily imported models brought in from Western colonial traditions and from other intercultural exposures. Such incongruities apply in medicine and industrial processes as well as in many educational conventions and

institutions that persist in Asia, Africa, and Latin America. WHO and other international medical agencies have begun to substitute preventive for curative medicine and paramedical personnel for specialists, along with community health centres for Westernized hospitals, to offset earlier 'misfits'. Engineers are beginning to develop 'intermediate', labour-intensive technologies to replace large-scale automated factories designed by Western industrialists. But the efforts to adjust educational systems to the changing dimensions of modernization are often the work of professionals trained in the tradition of the 'misfit'. There are still gaps between 'technology' systems and social requirements in the educational sector in most countries.

Appendix: Examples of first-order decisions

1. Comparative analysis of existing experience

Educational planners cannot often foresee the costs and other incidental consequences flowing from decisions to introduce or to change a basic technology. Most empirical information is prepared retrospectively in order to evaluate decisions already made. But the existence of such evaluative studies, even when they were originally commissioned to confirm or challenge a decision already made, makes it possible to appraise the probable costs, or at least the range of probable costs, of introducing a new or unfamiliar technology in a similar environment.

Prudence dictates that such innovations as television, radio, or computer-assisted instruction should appear first as pilot studies, introduced on a small scale. But experience demonstrates that the resultant knowledge may be hard to generalize as a basis for large-scale activities. Determining the feasibility of a proposed technology on a mass scale is not the same as judging a pilot project to be a success. Among other things, large-scale operations involve the displacement of existing systems—something no planner is likely to risk except gradually or on a 'spot' basis unless the advantages are overwhelming.

Moreover, educational planners making such choices at the outset of programme innovations are handicapped by their lack of personal experience with the new technologies. Most data are supplied by interested parties (that is, consultants or manufacturing firms and their distributors, whose function is to promote the innovation under consideration). In short, the alternative thus presented to educational planners is usually to accept or reject a 'package' which is placed before them by interested parties. Inflexible 'prepackaged' technologies are too often the result of such decision-making.

One way of reducing the risks in this dilemma is to consult comparative studies of the experience in both pilot and large-scale innovations made in

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a wide range of settings. Such studies can provide educators with at least one basis for making approximate estimates of relative costs of the technologies under consideration, even though the benefits and side effects may remain obscure. Cost/benefit analyses by the International Institute for Educational Planning, the Institute for Communications Research at Stanford University, and other leading centres are especially useful for this purpose.

A recent evaluation of new technologies used standardized means for comparing input costs for instructional television in five countries, and for instructional radio in three. The results showed marked contrasts in study/hour costs, based in part on the numbers involved. The unit costs in such cases were computed on the basis of the average hours per student as well as the costs of operation and installation of the facility. The analysis showed 'reasonable' costs of televised instruction (5 countries) ranging from 1.5 cents to 15 cents per student/hour; instructional radio (3 countries) cost from one-third of a cent to 3 cents or 4 cents per student/hour. Actual experience ranged even higher (American Samoa was more than $1 per hour because of the low numbers of classroom hours and students involved). Computer instruction can come to less than 10 cents per hour if there is no direct student interaction with the computer (such 'on-line' programmes can cost as much as $5 to $10 per student/hour). These figures must be compared with printed material costs (offset) ranging down to half a cent per page for a 250-page volume.

It should be noted that actual costs in most cases greatly exceed advance estimates, especially those made by potential producers and foreign sponsors. As the other case studies in this appendix illustrate, these first-order decisions are rarely made on the basis of costs alone, or even that of technological quality: but such considerations can be ignored only at the planner's peril.

2. *A country case: teacher training in inaccessible areas—Nepal*

In 1953 Kathmandu was as far as three months' travel from some of the remote villages of Nepal. The mountainous terrain, with villages connected by narrow footpaths and suspended rope bridges, required some villagers to trek for weeks of sustained movement to reach the capital. Couriers delivering important mail or packages travelled in groups along regular paths and scheduled overnight stops—like the pilgrims to Canterbury—to provide an informal communications network in areas that could not be reached by radio or automobile.

For teachers working in the rural areas, the possibility of going to

Kathmandu to gain accreditation by studying pedagogy offered a chance for a new career, not just a respite from the 'idiocy of village life'. Invariably, upon completion of their training, these teachers refused to return to their native villages. And any attempt by the Ministry to rotate them into other areas met with hostility from villagers who distrusted strangers. As a result, many remained in Kathmandu. The apparent choice faced by the Minister of Education in 1953 was whether to discontinue the programme by which training and opportunities for advancement were provided to rural teachers, or to continue draining them away from their villages into the capital city.

The technical innovation that finally made it possible to resolve this issue was simply to introduce mobile training units that could be established at strategically dispersed locations. These mobile units were manned by central teams of six to eight specialists (professional education, social studies, science, mathematics, arts and crafts, health, and language), who would establish themselves locally for a 6-9 month period while teachers from the region were trained within commuting distance from their families. No major second-order innovations were required to staff this programme, since the normal school of the College of Education provided mobile training teams on a rotation basis from their own faculty and other qualified ranks.

As to the third-order decisions, teachers were recruited for training by an advance team which made preparations for accommodations and other logistical support, and arranged a fixed, uniform stipend for the teachers while in attendance. Programmes could be set up as soon as 50 teachers were available for instruction in a given region.

3. The Mexican Telesecundaria

Evaluation of this early experimental use of educational television demonstrated that it was cost-effective when compared with regular secondary-school instruction. Costs, including administration, facilities, teachers, student expenses, and television were estimated at approximately $151 per student/year for Telesecundaria, as compared with $200 per student/year in secondary schools. There was no sacrifice in performance on the tests administered at the end of the school year. Indeed, achievement tests in mathematics, Spanish, and chemistry showed a slight benefit for the Telesecundaria students. Urban students performed better than rural students in both systems.

The programme was introduced in 1966, originally using closed-circuit broadcasting to reach 83 students enrolled in the seventh grade of an experimental school in Mexico City. In 1967 the broadcast programmes were extended to 6,579 seventh-grade students in schools throughout eight

states. The number enrolled in the succeeding years continued to grow at a more gradual pace as the seventh, eighth and ninth grades were covered by the system. By 1972, there were about 18,000 graduates from the system.

Students were grouped in classes where possible, working under the supervision of 'co-ordinators', who were chosen from the ranks of accredited primary teachers and assigned to the project after receiving special instruction in the use of television. The classrooms used in most of the Telesecundaria schools were usually leased or lent; in some cases special facilities were built by parents' associations. Because the teaching methods in common use in Mexico rarely involved class discussion or the use of audiovisual material in any situation, the evaluators were able to detect little difference in classroom performance between regular and Telesecundaria instruction.

From the standpoint of the educational system as a whole, the television facilities represented an additional service (and additional costs) rather than replacements of existing functions. New facilities were required for it, and they were roughly comparable to those used in the regular system. There were fewer administrative personnel involved in the operation than would be required for simple expansion, however, and the teachers, having somewhat less training than traditional secondary teachers, received lower salaries for their work. The classroom facilities were also less costly than in the regular system. The net effect of the programme was that it reached additional students at lower cost than would have been required if regular schooling had been offered. On the other hand, if there had been no such technological resource as TV, these communities would have not been on the budget at all.

Both in the Mexican press and in professional circles Telesecundaria was strongly criticized as being inferior to the regular educational system. Part of the negative response may have resulted from the fact that the televised teaching was on public display (anyone could tune in), while classroom teaching was normally subject to evaluation only by students. And even the best teaching on television was less 'catchy' than the entertainment fare offered on the other channels.

After evaluation of the experiment in 1972, administrators were faced with several options: to use television more extensively so as to reach other rural areas not served by the regular educational system; to eliminate 'live' studio productions in favour of videotaping so that the best programmes could become standard in the existing service; to mount special recruitment efforts to enlarge enrolment in existing service areas in order to reduce per-student costs of Telesecundaria in the future; to extend regular secondary instruction to replace Telesecundaria in areas where it had proved attractive; to experiment with cost-reducing approaches, such as using co-ordinators drawn from lay circles instead of accredited teachers; or to start a gradual phase-out of Telesecundaria as it became possible to extend regular educa-

tional coverage to the communities now reached by TV alone (the policy favoured by the teachers union).

It is important to note that Telesecundaria was not merely a technological innovation. A number of second-order decisions were responsible for its effectiveness, including the decision to make use of local resources to provide classroom facilities rather than to build them through the educational system (which could be adapted to regular schooling) and the early decision to establish a separate identity for the Telesecundaria bureaucracy, independent of and apart from the regular educational bureaucracy. There was no unusual attention devoted to problems of motivation; possibly the teachers union and the ministerial planners could have been motivated to support the programme if that issue had been considered more systematically.

Comments

As these cases illustrate, first-order decisions are usually dominated by such considerations as the following: (a) the appeal of the technology itself, (b) the anticipation of low unit costs of operation, (c) expected economic benefit from the capital investment, (d) the hope of maximizing scarce trained manpower (skilled teachers), (e) the possibility of reaching remote or inaccessible areas difficult to serve by existing methods, (f) the desire to upgrade the quality of content of instruction, and (g) the possibility of developing national standards independent of foreign influence.

IV. Second-order decisions

Reformers who approach educational problems in terms of administrative change confront issues entirely different from those presented by first-order decisions. In considering alternative institutional arrangements, they draw on theories and formal models that came originally from studies of the private sector. In translating these models to the public sector, they retain the two major goals of industrial organization: *efficiency* (getting the most productivity out of the available resources) and *effectiveness* (reaching the largest number of targets assigned as organizational objectives). They seek to improve performance on both goals by streamlining the flow of organizational tasks and by standardizing and routinizing certain functions performed by individual members of a bureaucracy.

'Efficiency experts', as organizational specialists used to be called, are no longer in much demand. Stop-watches have gone out of style even in private industry, which is generally more production-oriented than the public sector. But 'management consultants' still continue to flourish; efficiency is thought of today as much in terms of management as of labour. The productivity orientation is reaching the public sector too, of course. But it is less obviously relevant in the field of education than in routine public operations, despite the fact that it is sometimes considered 'inefficient' and 'ineffective'. Educators, like other professionals, resist the notion that their functions can be improved by the devices of modern management. Its specialized careerists are organized along professional lines. Like other organization men and women, they tend to adopt a defensive posture when new second-order decisions are proposed, perceiving a threat to both their autonomy and their traditional procedures.

The supposedly inherent conflict between the self-interests of a bureaucracy and the public interest has led many critics to despair of the prospects of administrative reform in any setting short of a 'cultural revolution' in the Maoist mode. Indeed, the experience of administrative reforms in the civil service is far from reassuring. Reforms are easily swallowed up by persistent organizational processes, which continue unobtrusively long after the discouraged reformer has passed on to happier tasks. New procedures can co-exist with the old until one or the other gradually withers away for want of support; and reform movements are notoriously deficient in stamina. Management units established by reformers to monitor the pace of progress and provide technical support for further innovations eventually become colonies and special preserves for old-timers, after which their rôle is more custodial than experimental. It is no wonder that historians of reform movements are rarely optimists.

Sometimes decision-makers recognize the difficulty of reorganizing an institution by by-passing it altogether in favour of some new, and at least temporarily responsive, organization. Thus, many second-order decisions can be best described as 'separatist movements.' This syndrome is well illustrated in the commercial/industrial sector. Many countries have developed an almost passionate commitment to public enterprises because it is so easy to organize them without having to deal with existing public institutions. Because they are not part of a government's bureaucracy, *public enterprises* look as if they were more efficient than *public agencies*—a proposition that is advanced without much evidence, perhaps because they bear an organizational resemblance to reasonably efficient *private enterprises*. Public enterprises seek to apply standards and controls of private companies without the discipline of the market-place, yet escape at the same time the bureaucratic restraints of government service. Like any hybrid variety, the new species may exhibit the *worst* characteristics of its parents as well as their best. Evaluations of public enterprise performance have noted that they are heavily staffed by bureaucrats drawn from the 'old-boy' network, who carry to the new organizations many of the habits and inhibitions they learned in the old. Escape from civil service regulations does not by itself introduce such alternative disciplines as competition from the market-place. When both bureaucratic discipline and competition are absent, these organizations seldom live up to expectations.

Examples of the 'separatist' approach to organization have also

appeared in education, where reformers have high hopes of improving performance by using institutions that are free of the restrictive procedures developed in the Ministries of education. Here, the 'hybrids' are competing not with private industry but with public schools. An example is the publicly supported but privately managed schools that have often served as pilot and demonstration projects for new procedures. Such experiments can reduce both the costs and risks of trying to change existing educational institutions.

Another example of 'separatism' is a special training institute established by operating departments of government for their own personnel. These programmes can extend the outreach of the Ministry of education to a variety of trainees not enrolled formally in the schools system. Similar programmes financed out of public funds but situated in private industry have equivalent multiplier effects, and Ministries of education are beginning to recognize a new rôle for their services as training consultants to public and private operating agencies.

The greatest cost of administrating separate organizations is the decline of quality in the core of government operations when talented officials focus their attention elsewhere. The Soviet Union's many experimental schools of the 1920s were obviously more interesting to educators than the rest of the system, which consequently suffered from 'benign neglect'. Too many separatist movements can weaken the administrative state just as they can the geographic nation. Experiments with special organization easily produce such counter-effects unless administrative reformers consider criteria for retaining specified functions as quasi-governmental, keeping some competitive, using some as training grounds, and bringing about convergence in others.

Making second-order decisions intelligently involves creative interactions among the institutions and individuals chosen to carry out the functions of education. It usually requires decision-makers to take special steps to gain the confidence of those who are expected to change their style of operations during the course of the innovation. Such events occur not by accident but by the most scrupulous attention to the dynamics of organizational change.

The issues most likely to contribute to the success or failure of second-order decisions can be identified by raising questions such as the following:

1. What institutional characteristics tend (inadvertently or not) to

reinforce or reward behaviour on the part of individual teachers and administrators that is inconsistent with the goals of the organization?

2. What functions of the organization can be improved by introducing competitive practices or institutional alternatives to its operations?
3. What procedures can be devised to enable students, teachers, parents, and other 'clients' of an educational institution to make the most effective use of its services?
4. How can educational organizations arrange their operations to provide flexibility for adaptation to local or special group circumstances?

Answering these questions satisfactorily has generated institutional change in many situations in which the organizations involved have participated in seeking a resolution of issues of common concern:

1. Countries and states that have rewarded successful teachers by transferring them out of the classroom into better-paying office assignments have found that the talents required for the two types of functions are not interchangeable. A more successful use of scarce resources would provide separate services or divisions for those two functions (good teachers and good administrators are both scarce—but even scarcer are the individuals combining both sets of skills). Organizational innovations involving the development of separate careers, each with adequate reward and incentive systems, have improved the quality of both instruction and management.
2. Countries that have eliminated private schools in favour of a uniform compulsory public system have found themselves deprived of alternative instruments for establishing standards and experimenting with educational methods. Once eliminated—fortunately or otherwise—these private systems cannot be easily reinstated (sources of capital and other forms of support can rarely be revived after institutional death has occurred). But experiments with special educational programmes in Ministries of co-operatives, rural or community development, public works, and labour, have all provided alternative avenues for pilot studies. These avenues have not been well travelled by Ministries of education, although in a few countries such experiments have produced pace-setting new methods of instruction and novel learning experiences.

3. Countries that have experimented with variant 'delivery systems' for training have been able to serve special client needs without making major changes in the educational structure. One example is the use of vouchers in some parts of the U.S.A. to provide public support for special industrial training in the private sector. Experiments have also permitted individuals to schedule their education in accordance with their working needs. After-hours or late-in-life situations are among the possibilities that have received recent attention. Teachers themselves have benefited from experiments that give them personal access to resources for professional advancement, thus providing a useful reinforcement to the desire for self-improvement and also raising the general performance level of educational organizations.
4. Regional variations in structure—especially those installed in response to local preferences—not only permit the adaptation of a curriculum to suit the immediate context, but also encourage better community use of the facilities and personnel of educational organizations. Such experiments enhance both their local standing and the sense of vitality that accompanies demonstrations of flexibility in large public institutions.

None of the organizational variants described above threatened the careers of teachers or the educational bureaucracy, though they rearranged functions and created opportunities that differentially favoured certain elements within the system. Second-order decisions made in an existing bureaucracy often involved slow, incremental change, in the hope that time and attrition would make the reform painlessly irreversible. The appendix describes several decisions that challenged the system more drastically. For the most part, however, their results have not yet hardened into 'permanency.' Second-order decisions above all others require knowledge and judgment about the processes of social change and the prospects for achieving progress without doing violence to the system. They are also of profound importance when it turns out that violence is necessary.

Appendix: Examples of second-order decisions

1. The Indian steel workers' training programme

Having commissioned the building of three steel mills in India by the Federal Republic of Germany, the U.S.A., and the USSR during the 1950s, the government at Delhi had to devise methods for training hundreds of workers just below the top management level without either installing costly facilities in India itself or becoming unduly dependent upon a single institution abroad. Accordingly, after considering the possibilities of using various sub-professional engineering and technical schools already functioning in the industrialised countries, the government decided to set up the Indian Steel Training and Educational Programme. Its purpose was to develop co-operative relations with the U.S. and other governments, several private and public universities, a private American foundation, and industrialists from a number of foreign countries.

Top management and supervisory personnel were to be trained in the USSR and Germany, as well as in Britain and Australia through the Colombo plan. An approach was made through the good offices of the Ford Foundation to the American Iron and Steel Institute to train, initially, 200 engineers on the job in a variety of American companies (U.S. Steel, Bethlehem, Jones and Laughlin, Republic, National, Youngstown Sheet and Tube, Kaiser, Armco, Pittsburgh, and the Ford Motor Company's Steel Division). A training plan was worked out associating each steel company (where the plant instruction was to take place) with a university (where background formal and theoretical instructions were provided). The co-operating educational institutions were Carnegie-Mellon University, Case Western Reserve University, Illinois Institute of Technology, Lehigh University, Youngstown University, Pomona College, and the University of Detroit.

Since this kind of elaborate mechanism was both untried and costly, the Indian government arranged for financing from the Ford Foundation

for the first two years, after which the International Co-operation Administration, an agency of the United States government, provided external financial support. The actual arrangements did not go through the processes of foreign aid negotiation, but used a series of contract arrangements, co-ordinated by the International Co-operation Administration with Carnegie-Mellen as managing agency.

The new steel plants in India participated in the arrangement by giving each trainee a specific assignment, in a specific Indian steel mill, upon his return. This precise planning permitted each man to develop special interests in the topics that were related to his future career, thus providing an excellent 'third-order' solution of the problem of maintaining the high motivation before and during the training programme in the United States.

2. *Decentralization in the People's Republic of China*

Two related problems were posed to educational planners during the immediate post-revolutionary period by the leaders of mainland China. The first was to create sufficient degrees of specialization in primary and secondary education, at low cost, to supply the manpower needs of the country; the second was to offer equal opportunities to all citizens deemed entitled to it. For both purposes, the decision that was made involved setting educational standards at a minimum level that could be observed throughout the country without sacrificing quality, as a demonstration that Communist procedures were not inferior to those left behind by foreign élites. The solution the Communist Party leaders reached was gradual decentralization of certain specific educational functions to local organizations, retaining a carefully defined rôle for the Ministry of Education.

The degree of centralization and the exact rôle of the ministry varied, largely as a function of various stages of the revolutionary development. Over the twenty-year period of the experiment, controls had to be installed under central guidance to protect local governing boards against colonization by local élites, and also against a repeated tendency to set up quality education or special schools for the children of leaders, or to expand certain preferred kinds of training beyond the manpower needs of the region. The central government also had to exercise care to equalize educational opportunities as between rich and poor areas of the country.

These decisions had to be reached during successive periods of re-examination of the relationships between education and society. From 1949 until the early 1950s, it was necessary to continue using the Anglo-American model based on a liberal arts education, and depending on English and American texts. From about 1952 until about 1958 the Soviet system provided the model, with emphasis on specialized and technical training. After

1958 Chairman Mao attempted to escape the trap of technical élitism by alternating tours of education with labour assignments and eliminating quotas and distinctions based on quality.

The major focus of decentralization called for developing local basic skills on a large enough scale to supply the specific productive needs of the region. An example that has become almost a cliché was training in chemistry as it applied to fertilizer production in different agricultural areas. Educators left it to local committees to determine curriculum needs for such purposes. All that was to be retained by the central management were the schools specializing in fundamental mathematics and scientific theory.

The process of decentralization also involved finding an appropriate balance within such local organizations as communes and production brigades. The principle on which these decisions were made was that wherever large numbers of students were to be trained, and wherever national standards were not actually required, the best tactic was to give maximum jurisdiction to the local people and the institutions closest to them.

When the Ministry of Education was established in 1952 it exercised jurisdiction over schools of higher learning. After the reform, only 40 of the two hundred and twenty-seven schools of higher learning were predominantly managed by the Ministry of Education and other central agencies, the rest being left to local control.

The permanency of these drastic reforms (themselves achieved only with judicious retreats when resistance became too great) could be assured only by the stamina and continued commitment of the political leadership.

3. Establishing an evaluation unit in the Ivory Coast

In 1967–68 the government of the Ivory Coast decided to undertake one of the most ambitious programmes of educational television in Africa. The plan was to overcome weaknesses in the existing education system and to enrol the entire population in primary school by 1986. The deficiencies to be resolved included a relatively low level of teacher qualification; an obsolete curriculum that had not been designed to serve purposes of national development; and high 'wastage' because of school repetition and drop-outs. Since only a small percentage of the population was enrolled in primary schools, and there were few facilities for adult education, the introduction of television would make it possible both to extend the system and to improve its quality. An out-of-school TV-based system for adults in both rural and urban areas was also to be established.

Unesco and the French government undertook to assist in the development of television facilities that would be integrated with more conventional assistance in curriculum revision and the retraining of teachers. By 1971

the programme was in operation and serving 20,000 first-graders. By the end of the school year 1973/74 more than half of all primary schools, serving more than one-fifth of the total number of pupils, were receiving televised instruction.

The programme was successfully inaugurated, but its sponsors were concerned both because production costs exceeded the estimate and because the quality of some of the instruction was below expectations. Moreover, a study conducted by the Planning Ministry demonstrated that the out-of-school educational programme did not change the behaviour of the target population, and that follow-up assistance would be needed.

These considerations led the Ministry of Educational Television, the Ministry of Education, and the Planning Ministry to conclude that a new evaluation unit was necessary to develop means of improving the performance of ETV as an instructional medium and to enlarge the social impact of the programme. Some of the funding would come from the United States, Belgium, and the Federal Republic of Germany, which would finance an 'external evaluation office' that would be responsible to the Educational Television Ministry in Abidjan. It would consider pedagogical, economic, and technological problems and prepare long-term cost-benefit studies in basic developmental terms.

Another branch, the 'internal evaluation service,' would report to the director of the educational television complex (the production unit) located in Bouaké. It would make use of pedagogical specialists only to carry out immediate feedback studies to improve the performance of the broadcasters and classroom monitors. Its funding would come primarily from French and Canadian sources and from Unesco.

The expectation was that having two distinct organizational units, related to different bureaucratic structures, might make it possible to ensure the objectivity and usefulness of the research carried out in the field, and that the two responsible agencies would also be able to balance each other's rôle by making the most effective use of field studies. In addition to evaluation as such, the unit was responsible for the development of a continuous administrative history that would record decisions made at different levels of responsibility and operation, including the options considered, the participants, the use of feedback information, the communications and flow of policy information, and the capacity to test and revise operating assumptions upon which the programmes were based. The administrative histories would serve as guides to the current evaluations, since they would suggest the conditions under which evaluation data proved to be most useful to decision-makers. But more importantly, they would provide, in addition to immediate management information and short- and long-term planning support, basic data regarding the operation of the system that could be used by other countries in the process of developing educational television and other technological innovations. Because the evaluation was intended to

gather data on responsive behaviour by teachers, pupils, and adults receiving out-of-school services, the reports would also be useful to economic planners and sectoral developers.

4. *Moving from pilot plant to operation: Radio Rural Forums in India*

The literature of social change bristles with reports of pilot studies, but there are few reports that show success in converting *pilot* into *operating* programmes. Development administrators have not systematically mapped out the processes of transition from small-scale, carefully guided experiments to large-scale, institutionalized, continuous activities.

Not that pilot projects are easy to administer, even in themselves. The Mexican experience with Radioprimaria in San Luis Potosi is a prime example of the use of radio on a pilot basis that never succeeded in establishing even its own infrastructure for maintaining equipment, integrating broadcasts with schooling, reaching the target population of least equipped, most remote schools, and sustaining student and teacher interest beyond the first fleeting acquaintanceship. The result was that, in the end, the only schools that benefited from the Mexican experiment were those already working reasonably efficiently, while the understaffed schools were unable to get radio equipment, or to receive the broadcasts, or to benefit from visits from inspectors and supervisors. One key appears to be that the experiment did not receive the kind of dynamic political support and operating leadership that pilot projects require.

The Indian case met with greater success. The basic radio broadcasting system already existed, to be sure, and many of the villages involved already had radio receivers. But other elements contributing to the success were new: the local communities were organized and ready for the experiment; collateral services from the agricultural ministry and the community development and *panchayat* apparatus were available; and the experience could be evaluated, monitored, and continuously improved during the period of the experiment (beginning in 1956). The villages in Poona had all of the pre-requisites that were needed: suitable locations for keeping the radios in proper custody; a shelter in which the members of the forum—perhaps 15-25 villagers—could meet each week; a designated individual held responsible for the radio and its maintenance; postal and transportation facilities; and a reasonably homogeneous village structure. One of the criteria for success was the making and recording of village decisions relating to development that were linked to the broadcasts.

Expanding the project from a single state to a nation-wide scale meant greatly reducing the unit costs of the weekly broadcasts, but at the same time it made it impossible to continue the close personal involvement

between the top leadership and that of the village level. On the contrary, the institutionalization and expansion of the system were scheduled according to impersonal, quantitative targets against which progress could be measured. There were 144 radio rural forums in 1956; 927 in 1959; and 1,902 in 1960. By 1961 there were 3,076; and the expansion continued until by 1965 there were 12,776 forums. It is noteworthy that the expansion of personnel during the period took place at the bottom levels; the chief organizer kept his office limited to 8 people during the first four years, and a district organizer and staff to 50, while the village-level workers expanded at a rate of 60 per annum, rising from 60 in the first year to 240 in the fourth year. The forum convenors increased their numbers at a rate of 25 per year, rising from 25 in the first year to 100 in the fourth year.

This expansion was possible because the programme started with a sufficient number of full-time organizers, developed adequate interest at each level of operation, worked out an organized procedure for maintaining radios, maintained adequate transportation for visits to the forum sites, and perhaps most important of all, insisted on very frequent communications between the forums and the radio stations. This feedback system was especially important to maintain the local orientation of the broadcasts.

A somewhat more controversial feature of the expanded service was the focus on action programmes that were linked to the radio broadcasts. As already indicated, the forums were expected to produce village-level projects which, in turn, would receive follow-up support. But the support required major efforts at inter-agency co-ordination. If the action programme involved the use of fertilizer, care had to be exercised to ensure that the fertilizer was available; and references to efficient methods of paddy culture could not be offered until local instruction in the new methods were available

Another problem in this action-oriented approach was that monitoring and evaluating the project was not a process of measuring knowledge transmission or recording decisions alone, yet the local inspectors were not trained in gathering data about what actions villages might undertake in response to the forum activity. Even so, the existing records of village decisions, especially during the first years of operation, suggest that a variety of local self-help projects can flow from these non-formal education projects, ranging from beautification and literacy programmes to the organization of co-operative marketing systems, improvements in local sanitation, and communal well-digging.

The most important decisions that were made in this non-formal education programme were organizational and motivational (second- and third-order). The technology was simple and readily available; it had even been pre-tested in Canada. But the specific social forms that institutionalized and mobilized village support were distinctively Indian. They constitute by far the most extensive and successful use of the medium for developmental purposes.

Comments

The issues dominating second-order decisions are generically different from those characteristic of other types: (a) concern over the quality of instruction that would follow if educational opportunities were offered faster than permitted by the capacity of the system to produce qualified teachers; (b) the impossibility of introducing or continuing the use of a costly technological infrastructure; (c) the hope of gaining popular commitment to educational goals and approaches; (d) the desire to introduce competition and tension within the educational system in order to reduce dependence on a single institution; (e) the need for continuous assessment of progress and deficiencies; and (f) concern over possible resistance or defensive reactions from personnel threatened with obsolescence.

V. Third-order decisions

The importance of motivating the 'clients' of development programmes is generally recognized in the educational sector, at least as a teaching function. But planners and administrators are also becoming aware of ways in which the educational system as a whole can influence and respond to the motives and values of students as citizens. As a result, educational institutions are increasingly expected to go beyond merely inspiring pupils to learn their multiplication tables and verb forms. Educators are now asked to find ways of reinforcing the state's efforts at social improvement, technological modernization, economic development, and other national goals. Schools are even expected to protect society against the excesses of state intervention by creating the moral and intellectual foundations of restraint against illegitimate purpose and activities. There is a fundamental ambivalence in the independence of educational institutions, which are supposed to change social values as well as to protect them. Because of its central position in the processes of human and social development, education is the most sensitive sector of the civic order.

Even if they seek to avoid these issues of social ethics, planners concerned with rational approaches to the responsibilities of education in a changing order have to consider such questions as the following:

1. How can the educational system encourage students to prepare for careers that serve the public interest?
2. How can educators and employers improve the 'fit' between career opportunities and career training, that is, between the formal processes of providing credentials and the basic task of identifying

the essential qualifications for skilled, professional employment?
3. What arrangements can educational planners make with religious institutions, trade unions, professional associations, political groups, and fraternal organizations to encourage talented individuals to pursue socially desirable educational opportunities?
4. How can the educational community encourage other public institutions to provide resources for public enlightenment and support for the arts and other higher-endeavours of the human race?

Countries that have responded to these issues have done so usually at the instigation of political leaders, not educators themselves. Perhaps because in recent decades educators have defined their function so narrowly, professionally, and bureaucratically, they have left to others the task of exploring the ultimate relationships of education to society, especially those linking human resources to human needs. Indeed, Ministries of Education are often at a disadvantage in contributing to third-order decisions—not out of indifference, but because of their care not to over-react to political initiatives in which they are expected to play a supporting rôle. Yet there have been initiatives that originated in the educational community. Educational planners have experimented with motivational innovations in each of those four areas:

1. Several countries have made efforts to draw university students away from law and literature, and secondary students toward industrial arts and other vocations. Teachers and educational administrators have nearly always been ambivalent in doing so, out of respect for freedom of student choice as well as their own traditions and preference. They have nevertheless succeeded in attracting students to new programmes considered important to national manpower needs, usually by offering career incentives to them. They have been less successful in negative approaches such as trying to discourage traditional preferences on the part of students. Attempts to deal with these problems by restricting admissions and installing quotas in overcrowded fields have only increased the psychic value of those subjects. Nor have educational planners been able to find ways of recycling instructors of 'surplus subjects' to other fields in which there are teacher shortages. In both cases the path of developing positive incentives to enter and prepare for essential careers is more productive than discouraging entrance into fields regarded as unproductive.

These issues are among the most important third-order decisions in the educational sector. The costs of neglecting them in order to protect the livelihood of obsolescent teachers, or the short-term interests of unemployable graduates are enormous. Surely they are far greater than the salaries that are paid for unessential services or the compensation paid to unemployed school-leavers. They include misdirected careers and blasted hopes as well.

2. One country found a way of motivating trainees to enrol in an one-the-job shop course by persuading the Ministry of Public Works to train its own equipment maintenance personnel and offering accreditation to the special school, thus providing first-class vocational education, attaching it to career needs, and at the same time supplying a needed manpower resource. Similar arrangements with factories, airlines, and a variety of public enterprises are beginning to appear. For a Ministry of Education to approach private industry for such purposes is a rare occurrence, however, promising though the pilot ventures have been. Other experiments included the reassessment of accreditation procedures and the standards for professional appointments in order to accomodate immediate needs: an even more formidable task because of the opposition of professional associations. One recent attempt at preparing paramedical personnel for participation in rural health centres did succeed in creating a corps of technicians in preventive medicine, and it provided first echelon services and installed referral capabilities for transmitting serious cases to specialist care. But in the end it was dismantled because of pressures to convert the training centre to a much more costly and inefficient medical school. In this case, the project succeeded in motivating students to enrol, but it did not gain acceptance and support from the medical community.
3. One country's success in launching and sustaining a literacy programme was attributable largely to reinforcement between religious and secular motives. Buddist monks offered their services and temple facilities to the faithful for special classes which permitted adults to gain the desired skills, while also reinforcing their religious commitments. Another example of institutional supplements to education is provided by efforts of labour and professional associations to encourage their members to improve their skills—an approach taken in Europe and America but not often welcomed by educational institutions in Asia and Africa.

When such organizations have offered incentives to individuals for self-advancement on a competitive basis, the results have improved the human resource potentials of the society and also motivated individuals to further their education.

4. In the area of non-formal cultural activities for public enlightenment, the educational establishment in developing countries has lagged behind efforts in the industrialised states. In societies which have a large private sector, cultural leadership has been mobilized outside the educational sector in support of self-improvement schemes ranging from museums and orchestras to children's TV programmes and handicraft communes. In these pluralistic societies, educational institutions have even had to compete with some of these initiatives in order to support high standards of public enlightenment, and to provide alternatives to the influences of commercial advertising and the media. Their magnitude and style may not offset the vulgar influences of most mass communications, but they do provide the public with alternatives that could not come from educational institutions alone. In societies with less diverse sources of mass communications, the burden of providing the public with diverse cultural opportunities falls on the educational establishment.

In countries where the educated proportion of the population is small, the responsibilities of the educational system itself are relatively great, since the development of human resources is such a high national priority. In these situations, educators have experienced so much popular demand for schooling that they may believe that problems of motivation are already resolved. But such conclusions are usually premature: the problems merely take on different forms, such as excessive expectations and misdirected motivations. The widespread parental hopes about the values of education have generated unrealistic social demands and distorted the functions of public schooling. It is a truism that multiplying educational opportunities does not multiply élite privileges.

Among the most serious problems of human resources are those popularly described as the 'brain drain', the loss of highly educated specialists attracted to other countries by superior economic and professional opportunities. Reversing such losses is not exclusively within the province of the educational system, but many of them can be reduced by careful collaboration with other institutions that are making third-order decisions. Among the actions amenable to initia-

tives from educators are: eliminating excessive recruitment of students in overcrowded fields; discontinuing the subsidization of exported human capital through over-generous support to studies where the return and retention rates are low; and abandoning the widespread reliance on high-technology, capital-intensive methods in professional schools (especially medical), which has produced so many 'over-trained' personnel who are unable to function effectively at home because of the more modest resources available for the practice of their professions.

Some experiments at reversing the 'brain drain' have proved highly successful, especially in Asia. They include the subsidized repatriation of needed professionals and the imposition of special taxes on professionals who remain abroad as emigrants while retaining their citizenship. Manpower planning efforts are also aiming to adjust some of the major disproportions in the educational balance of choices in Africa and elsewhere.

Third-order decisions such as these represent the most elusive problems of educational policy-making. Yet they are becoming increasingly important functions in national development planning. An educational system has to be what the society wants it to be, if it can; but it has the responsibility for creating an informed social demand, too, if it can. It is both an object and source of social change.

Appendix: Examples of third-order decisions

1. Motivating students to participate in work-study in the People's Republic of China

Certainly one of the most puzzling achievements in China's educational reforms resulted from third-order decisions made by the political leadership. Having decided to re-structure the system to accommodate the manpower needs of the country at the lowest cost to the central and regional governments, they were nevertheless determined to protect the egalitarian ideology of the revolution. This paradox required them to motivate millions of individuals to share the immense burdens and limited opportunities. Students were to devote half of their educational hours to productive work in farms and factories, and all their wages or earnings were to be diverted back into the educational budget rather than retained by the students themselves. No students, however intelligent or well-connected, were supposed to be exempt from the requirement.

This curriculum design served the important national needs, but it removed from the educational system one of its primary incentives, the hope of advancement that would permit students to escape toil and bondage. There was to be no special reward to individual student workers whose productivity exceeded average norms, nor was there the psychic reward for joining the élitist ranks of arts graduates.

By 1958 Chairman Mao had arranged that the half-work, half-study schools were to be managed directly by brigades or commune production teams with little or no financing from the state, which would have correspondingly little control over admissions and course designs. The primary instrument for mobilizing student support was the offering of intensive, organised, and continuing student participation in the management of the schools and departments. A 'three-in-one' management system represented students, teachers, and party leaders on each school board. Although the party members were intended to play a 'leading rôle' in these matters,

student opinion was solicited in determining what courses would be offered, what their contents would be and what teaching materials were to be used, as well as what methods of instruction.

The work-study model was intended to alter the traditional teacher-student relationship fundamentally. Occasionally the teachers were attacked publicly as representatives of a 'mental aristocracy'; they were subjected to personal intimidation and disrespect as well. In the governing bodies established locally for the schools students played important rôles, participating in decisions both to transfer teachers and to change their classroom styles. Problem-solving in the classroom was to be substituted for didactic methods and open book examinations for memory tests. Even the amounts of academic work, the numbers of courses, and the depth of material they covered, were reduced as a result of student participation. The traditional Chinese rote learning began to disappear from the system.

The teachers' rôles were re-asserted after 1960, however, as the momentum of reform seemed to ebb and flow in accordance with some social counterpart to the 'law' of action and reaction. Nor was the motivation of students truly self-renewing. One report issued a few years after these reforms estimated that only 20-25 per cent of the students were enthusiastic about them. Some of the 1958 work-study schools had to be terminated in in the early 1960s. Even in China, it is difficult to get people to abandon convenient traditions. One of the transferable lessons of Chairman Mao is that no reform is so universally beneficial that it sustains itself.

2. *Motivating teachers to graduate: Guatemala*

In the middle 1950s the Ministry of Education in Guatemala discovered that more than half of its rural teaching staff had no education beyond the fourth grade (1,800 untrained teachers were working in the rural areas). In the normal course of events, these teachers would have had to be sent to elementary and secondary schools to complete the missing grades—a process which, if scheduled as traditional summer courses, might take as much as 24 years. How could they be motivated to improve their knowledge and skills?

The approach taken for upgrading these uncertified teachers involved two summer terms and two full years of supervised teaching. Over the period from 1954 to 1963, 1,800 uncertified teachers were scheduled to complete the accelerated programme. Shortly afterwards the enrolment was almost doubled.

The first stage was an eight-week workshop in basic education (language arts, arithmetic, general science, social studies); professional education (child development; measurement and evaluation; history and philosophy

of education; study and development of the community); methods (classroom management, school administration, special methods, classroom observations in a demonstration school); and laboratory and practical experience (home life education, health and recreation, agriculture, manual arts, and supervision).

After completion of the summer workshop, the teachers returned to their schools where they received supervision by mobile teams who conducted in-service conferences and also arranged for correspondence and home study work for the teachers. The second summer vacation included an advanced version of the eight-week workshop, followed again by supervision for a second academic year. Upon successful completion of the second workshop, the teachers received elementary school diplomas; after the second year of classroom supervision, they received rural elementary teacher's certificates. The programme provided extra compensation for those who were certified.

Participation in the programme was entirely voluntary. The benefits were perceived as improved self-respect for the certified teachers as well as increased pay. The Ministry of Education was so enthusiastic about the results that it expanded the range of opportunities for certificated teachers, including an advanced programme over a three-year sequence, leading to a diploma on the basis of which further salary increases were authorized.

3. Mobilization of support for educational reform in Ethiopia

The shortcomings of the educational system in Ethiopia in 1971 resembled those of many other countries: traditional methods were reaching only a small fraction of the population, and even they were not being effectively served in terms of development needs. Yet the Education Ministry, like other agencies in Addis Ababa,[2] was highly centralized and professionalized, and its operations followed a mixture of standards and vocations developed from international sources. How could such a system change itself?

The device adopted was to bring together representatives of the Ministry of Education with those of other development sectors to explore their common interests through a large-scale public review of the inter-relationships between education and other national goals. The Ethiopian Education Sector Review (EESR) eventually involved more than 150 people working together over a period of one year. The group included representatives of the Ministry of Education and the International Bank for Reconstruction and Development, working through a general directorate assisted by fourteen task forces. All of the chairmen and principal officials of these study groups were Ethiopian citizens from public and private life, but an inter-

national panel of consultants was also brought in to provide technical advice on special topics and to participate in integrating and synthesising the recommendations and conclusions of the task forces. The task forces studied educational objectives, educational opportunities, the co-ordination of education, manpower, curriculum and methodology, vocational and technical education, out-of-school education, and other special problems. In addition to the fourteen task forces, four other study groups and two consultative panels were at the disposal of the directorate.

Work began in the autumn of 1971. The task forces were set up in November, and they submitted their preliminary reports in time for a symposium that was held in January 1972, after which a series of seminar groups worked with the task forces to formulate recommendations, organized a final conference in July 1972, and presented their proposals to the Ethiopian government shortly thereafter.

The Task Force findings were valuable not so much for their innovativeness (indeed, they contained few surprises to observers of the educational system), as for their political effect (members mobilized data and personnel and presented their ideas systematically, thus creating a constituency for reform that had not existed before). The discipline of formulating alternatives to the existing system forced educators and other leaders to come to grips with such issues as the costs and benefits of different approaches, possible sources of resistance, and the need for generating political support for change.

The Task Forces concluded quickly that the probability of achieving desired goals—including 90 per cent participation of school children in primary education—without major reforms was low. At current rates of expansion, the educational system would reach the target only during the third decade of the twenty-first century. Three alternatives were considered:

Strategy 1: Continuation of the school system, based on 6 years of elementary schooling, 2 of junior high school and 4 of secondary. The curriculum to be enriched by work-oriented and environmental studies. Conversion to a two-shift basis with student attendance of three and a half hours per day on an extended school year of 220 days. Projection: enrolment of 66 per cent of the relevant school population by 2000.

Strategy 2: Re-structuring the school system into four-year blocks of primary, middle, and secondary education, each complete in itself, but progressively sequenced. The primary system to be available to all citizens and the curriculum to include communications and computational skills, physical culture and self-expression, practical arts and environmental studies. Students to remain in the programme until the basic level of competence in each of these areas had been reached, whether two or six years were required. The double-shift, 220-day school year to be retained. Teacher requirements for the primary level to be eased. Formal national educational tests not to be applied to the primary system, which would

be free to vary according to local needs; only in the middle and secondary schools were the tests to be applied on a nationwide basis. Community 'practicums' to be installed to provide non-formal education and introduce other community resources. Projection: because of this increased reliance on non-formal education, enrolment of 90 per cent of the relevant school-aged population by the year 2000.

Strategy 3: A two-track system, into which students could enter at the age of 9 or even later, in order to speed the learning process and time graduation with the pupils' readiness to enter the labour market. The first track of the system to follow a pattern of 4-2-4 years for the three blocks of education; the second track, designed for the older students, to provide a two-year 'basic formation' followed by a three-year 'secondary formation' education system with attendance to be scheduled for late afternoons or early evenings for the convenience of workers. Cross-overs between the two tracks to be permitted. Greatly enlarged non-formal education programmes to be organized by village development centres to supplement the formal training programme. The plan should permit the gradual phasing out of track two as the need declined.

In the July conference, these alternatives were considered, and a compromise proposal was developed, retaining the four-year blocks of Strategy Two, but permitting the two-track system proposed in Strategy Three. The minimum entry age was to be 7 rather than 9, as proposed in Strategy Three. In comparing the conditions and outcomes of the three suggested strategies, it became apparent that all favoured decentralizing education to the provincial governors, at least at the primary level. The central ministry and its fourteen provincial offices were to retain responsibility for secondary and higher education.

Comments

Most of the third-order decisions considered here involved linkages between educational and national development needs. The issues that concerned decision-makers included the following: (a) inspiring individuals to make career choices consonant with national needs; (b) inducing other sectors of the economy to supplement and balance the efforts of educational institutions; (c) changing the reward structure within education so that academic objectives would reinforce social goals; (d) creating professional improvement opportunities on a scale that would be practical for impoverished rural teachers' participation; and (e) countering self-serving tendencies of the educational bureaucracy.

VI. Linkages to development

Development is, of course more than a series of decisions; the realities of social change rarely permit planners to segregate their decisions into neatly packaged 'orders' separating the systems of technology, organization, and motivation. This decision paradigm does not describe a social process but rather the essential rational categories for (1) analysing the potential impact of alternative government actions designed to influence the general processes of social change, and (2) evaluating the consequences of specific past interventions.

Although economic planners have only recently incorporated education among the production functions for purposes of national economic analysis, the rationalities for doing so are now quite clear. Perhaps no sector of development can gain more than education from a systematic analysis of these three dimensions, since it affords so many alternative approaches to technology, organization, and motivation and since all of them can powerfully influence the social outcome. Moreover, of all sectors of development planning, education alone has ready access to each of the disciplines required for considering alternative systems, and for optimizing the choices presented and sorting and integrating them in accordance with assigned national purposes. And because of its diffuse character, it is especially vulnerable to errors and miscalculations in all three arenas of potential decision-making. Thus although the 'decision-order' approach does not exhaust the range of responsibilities of educational planners, it is a device that permits them to allocate their resources in accordance with social needs.

Each of the preceding sections has considered four questions:

first, what resources (of technology, organizations, and incentive) could be used to supplement the individual efforts of educators; second, what external organizations could reinforce the purposes of educational institutions; third, how the 'client's' efforts could be supplemented by the application of *external resources;* and fourth, how the educational function could be related to the larger *social context* of needs and resources. Each question served to illustrate alternatives to the existing educational system.

Other, more specific, questions could be considered equally well in the context of the three decision orders, such as how education could contribute to major social reform in other fields such as land reform or local self-government; what the relationships are between education and specific policies in other fields (population and environment, for example); or how formal and informal education approaches could be used to deal with social problems such as crime, drug use, or unemployment. Technological, organizational, and motivational choices in these fields, too, can integrate educational with other developmental objectives.

Most developmental issues relate, in the end, to education. It was once fashionable to equate development with economic indicators that translate into smoking factory chimneys and overcrowded cities; but the current view focuses on social change, notably when it involves improving the quality of life for the very poorest population in rural areas. All social changes begin with individuals; in the absence of coercion they do not occur without a vast popular commitment. And commitment requires understanding (or misunderstanding) of what is to be abandoned and what adopted. When social change is used in the context of development, it can be fairly defined as a major behavioural consequence of education.

The most important (though not the only) manifestation of individual change is some form of active commitment to a different way of doing things. Such a commitment may be best described as an *investment,* that is, a voluntary allocation of labour or capital in some fashion that is calculated to produce a future benefit. It may take the form of an immediate benefit postponed or forgone in the interests of a specific future advantage. It may involve willingness to sacrifice time and immediate earnings in order to undergo training, or to give up the fruits of a child's services so that he can attend school; it might require the purchase and use of fertilizer, or the management of irrigation channels, or the labour of double- or inter-

cropping; it could also involve the use if contraceptives, or the undergoing of sterilization operations; or it might appear in the form of new work disciplines and regular hours, scheduled tasks, and hierarchical relationships of factory life; it could involve boiling drinking water, or spraying the house, or taking more trouble to dispose of wastes. In short, the forms of investment that individuals may make in modernisation are all products of their understanding of the requirement of modernization, and their acceptance of the concept that it can return benefits to them.

These investments are in varying degrees observable and quantifiable. The rate of 'modernization' can be calibrated and measured as public or social responses to the opportunities for productive change. But in each field, individuals make such investments only when they become aware of new standards of performance or behaviour. Basic knowledge in agriculture (e.g. when to remove weeds), economics (e.g. the concept of interest), and health (e.g. germ theory) permits individuals to make, or reject, the necessary investments freely. Education thus makes modernization possible when it provides the basis for this knowledge. An understanding of such principles or standards raises the probability that the investments required for modernization will come from voluntary decisions of the public.

The contributions education makes to development are not, of course, limited to such formal knowledge. Efforts by universities to provide extension or other extramural or 'outreach' services are now commonplace, and they include a wide variety of non-academic subjects, ranging from artisan skills to attitudes of entrepreneurship. Such programmes rarely enjoy high prestige in their university setting, but they are sustained nevertheless because they can acquire a strong sense of commitment from their participants and from political leaders in the central government. Because of their potential contribution to the development goals of government, programmes of this kind have recently been receiving the same careful attention that educational planners bestowed in the past on improvements in primary and secondary education. They are even beginning to serve as substitutes for formal elements of the educational system, especially in regions where schooling opportunities have been limited by resource and other constraints. Planners allocating budget support to university extension activities have also begun to assign higher priority to manpower-based services than to traditional educational

functions. The financial amounts involved in these new programmes are small, but their growth rate is rapid.

Educators associated with more traditional scholarly pursuits tend to accept these unaccustomed functions with reluctance. University faculties are often the last to join in support of ventures that will 'dissipate' university resources in non-scholarly directions. Science departments are sceptical about accepting development-oriented research assignments even when sophisticated analytical techniques are involved. It is not unusual for research sponsors to by-pass universities altogether, relying on personal contracts for obtaining the services of individual professors.

Education serves three basic functions in the context of development : generating, transmitting, and applying knowledge within the framework of purpose created by the state and other social institutions. Each of these functions involves planners in different ways: the generating function, through support to research and the provision and assignment of knowledge specialists; the transmission function, through schools and the provision and assignment of teachers; and the utilization function, through institution and individual grants and contract arrangements. Educational planners are most deeply involved in the transmission function, which is taken as the primary rôle of educational institutions.

Because of this preoccupation, educators are often unaware of the possible contradictions between the diffusion of knowledge and the other functions. They tend to regard the *knowledge-generating function* as subordinate to it. Thus ministries of education sometimes object to proposals to transfer personnel and equipment from 'pure' to 'applied' research because they regard the former as more readily adaptable to classroom use. To be sure, the distinction itself is difficult to define; in practice it usually means problem-solving that occurs under other sponsorship. But many countries are now expecting research committees to assign the higher priorities to developmental, not academic studies. Government sponsorship is beginning to compel universities to regard economic planners and operating ministries as potential 'clients' of research. A rising consciousness of the rôle of technology in development is beginning to highlight the university's function in the generation of knowledge. Development planners, treating technology as a factor in development, want to see research oriented toward specific and immediate needs, relieving their economies from dependence on Western technologies

developed in a different social context. As a result of these changed perceptions about the utility of knowledge, educational planners, economists, and technicians are beginning to create new links with each other in nearly every country. National science councils, ministerial offices of science and technology, sectorial commissions, and international linkages in both the public and private sector are increasing their demands on the resources and attention of educational planners and administrators.

The potential links between knowledge transmission and development are not by any means fully exploited in educational systems. The 'manpower' approach to educational planning, for example, emerges out of the notion that human resouree development is a primary product of education. But supplying various forms of skill required for modernization understates the need for using the educational curriculum to improve the life styles and serve the immediate needs of citizens in rapidly changing societies. These relationships are now being expressed both in movements toward decentralization of educational decision-making to local and regional levels and in exploratory efforts to enlarge the function of political leaders and other influential laymen as participants in educational planning. It appears that countries with centrally planned economies have made a greater commitment to development-oriented education than the pluralistic societies have, though experiments in the latter have also demonstrated a wide range of organizational devices that can be used to link educational institutions to development needs.

The weakest functional link is that connecting education with *knowledge utilization*. The educational community is hesitant to push new technologies because of its unfamiliarity with the exact needs of potential users; users confirm this hesitance by expressing the widely held view that educators are abstract and impractical. The result is that much of the momentum for technological innovation in all fields comes not from Ministries of Education but from international sources (the United Nations and bilateral aid agencies, multinational corporations, regional research institutions, and international professional associations) or commercial enterprises, whose purposes may be only partly congruent with a given nation's own development needs. Economic and educational planners are becoming aware of these disparities and are beginning to organize links between operating agencies and universities: between ministries of agriculture, with their experimental farms and demonstration stations, and uni-

versity departments of agricultural sciences; and between industrial laboratories and institutes of technology and the physical sciences in the schools of engineering, for example. Some of the most dramatic successes in technological discovery and innovation have come from special task force arrangements that bring together universities and agricultural or industrial enterprises, both public or private, in the development of new products and processes that make use of special resources of the country.

Education as the source of systematic development, exchange, and utilization of knowledge is no longer the exclusive preserve of educators.

VII. Priorities and sequences

The clarification of past decisions and alternatives can be more than an interesting historical exercise: it can guide future choices and it can also influence current corrective action. Any such application depends, however, on the priorities assigned to different rôles of an educational system, and on the sequence in which future decisions are made. The practising reformer has to negotiate with many different actors in the drama of change, all of whom are pursuing their own values with varying intensity through time. Thus it is not enough for him to analyse the functional characteristics of the educational system he is reforming; he is also concerned with the assignments of priorities and the probable effects of changing the sequence in which major decisions are made.

The assignment of priorities for educational reforms logically precedes the selection of decision functions for review, since changes in the technological, institutional, and motivational subsystems are not equally effective in coping with all sources of dissatisfaction with the performance of an educational system. When major regions of a country cannot be served by primary schools, the situation is likely to call for a new technology or a new channel for providing education. When elements of a society that need training have no access to it, the situation is best corrected by changing the institutional arrangements for education. When disproportions appear between the trained products of the system and the manpower needs of the society, the situation calls for new incentives for students, teachers, and employers. When costs rise beyond the resources available, supplemental changes in both technology and institutions are necessary. When politically significant sectors of the society are dissatis-

fied with the content or methods of teaching in some part of the system, the most urgent problems are motivational. Each of these problems requires changes and adjustments among the three subsystems; each might be ameliorated by changing choices made under a single order of decision, but there will also be corresponding effects on other parts of the system as they react to the leading edge of change.

Choosing the 'leading edge of change' is not a mere matter of making rational predictions of the consequences of different subsystem strategies. Much depends on the nature of the objectives. Consider, for example, an educational reform undertaken to reach an area that is inaccessible to conventional schooling. We have already suggested that a solution could depend on the use of radio or television; but if the areas to be reached are sufficiently developed, another approach would be to create community-based schools that could be operated without benefit of accredited teachers. The cost of the decision to employ the first-order response is financial and technological; that of the second, bureaucratic and political. In either case, the third-order functions require appropriate rewards to pupils in remote areas served by the unconventional system, perhaps in the form of full or partial accreditation of what in other circumstances would be considered a substandard education. In this case, the first-order decision is not likely to provide a leading edge of change.

Another objective would produce different interactions and priorities. A programme designed to achieve higher standards of adult literacy could use such technological innovations as cassette modules or television, but an informal programme such as the 'Each one Teach one' formula first heard in the 1950s is more likely to serve the purpose, especially when the motivation of potential beneficiaries is reinforced by the existence of a supply of useful reading matter. Other reforms may be aimed directly at developing educational services that could promote specific behavioural changes; but even these more concrete objectives can produce a different perspective among the decision functions. Changes in cultivation practices, for example, are likely to occur when educational programmes are organizationally linked with the Ministry of Agriculture. Technological innovations are rarely necessary in the educational system itself to accomplish these behavioural objectives: the one-room schoolhouse is a satisfactory teaching institution when the numbers

are small and a school farm can be added to it without any substantial changes in the supporting institutions, and still provide sufficient motivation to keep the pupils and their parents committed to continued education. Educational programmes designed to equip city children for contemporary life often need to give priority to motivational decisions that will affect their vocational choices, perhaps through the use of apprenticeships and placement services, with other decision functions flowing from those arrangements (for example, organizational links with potential employers and the augmentation of classroom teaching with laboratory facilities or special arrangements with guilds and trade unions).

These situational considerations do not always dominate the decision-making process, however, because the reform needs perceived by different participants can differ so radically. The first-order, technological strategies tend to be favoured by planners and technicians who are interested in economies of scale and the reduction of repetitive functions. But when career officials in the Education Ministry are responsible for introducing improvements, their preferred strategy is more likely to involve moderate organizational changes or training associated with new career opportunities. Political leaders tend to be the reformers who are most concerned with third-order decisions, though their concerns rarely influence the educational system except in crisis situations.

Clashing priorities explain some of the major malfunctions of education. Educational bureaucracies in many former colonial states have clung to functions and career parterns established by the metropole during the years prior to independence, permitting structural rigidities to veil the possibilities for change that were in the dynamic elements of the system. During the readjustment to independence, bureaucratic processes tended to inhibit the introduction of new technologies and revise curricula even when they were better adapted to national needs than traditional approaches. Even when governments have proceeded to make substantial investments in the simplest system changes, such as electronic technologies, they are rarely used effectively because the technological system is so often designed without considering the implications for teachers or providing for local needs. First-order decisions made in isolation from the other functions have as much potential for system distortion as do second-order decisions.

Examples of both cases abound. The primary reason why instruc-

tional television could not be substituted for classroom teaching of selected subjects in Samoa is said to be the teachers' collective rejection of a technology that had been introduced too rapidly and on too wide a scale. In El Salvador, the only way to get around a ministry that opposed a similar innovation appeared to be to establish a new organization to manage the educational innovation—a form of the 'separatist movement' psychology described in Section IV. In the end, the solution came when the leading proponent of change was appointed Minister of Education. The rapid introduction of technological experiments in the Republic of Korea is sometimes attributed to the existence of the Educational Development Institute, whose function is to promote innovation; but the innovations themselves were dominated by technology, and the country has relied excessively upon coercion to motivate social change.

Each of these decisional functions interacts with the others to create, reinforce, or eliminate decisions in the system as a whole. Television, radio, or cassettes require uniformity teaching plans over large areas, thus imposing limitations on local variation and foreclosing the possibility of offering individual students much of a rôle in curriculum development. A decision to establish different organizational structures for different regions or functions of education permits greater experimentation with first- and third-order decisions than will a uniform, centralized instructional base. And once students or teachers are motivated to improve their performance by participating in decisions regarding curriculum design, career development, or the budgeting of resources, large-scale experiments with new technologies and organizations become unlikely because they are so difficult to co-ordinate.

The 'side effects' or incidental benefits that these three sub-systems of reform introduce are also factors in decision-making that may not be immediately apparent from the expressed purpose of the reform. Some leading beneficiaries of change are external to the educational system. Companies making and selling sophisticated equipment or services can distort reforms to serve their interests while introducing only marginal gains to education. Other external influences that can affect, or distort, organizational and motivational decisions include: ideological preferences for centralized or decentralized styles of management, international standards that may not be relevant to local requirements, donor agencies committed to preferred types of

investments and political forces manipulating curriculum changes to support particular views of social justice. The most influential groups, of course, are the teachers, especially those organized into unions and professional associations. They, together with the permanent administrators in the educational ministries, possess a combined weight that has ended experiments with first- or second-order changes in more than one country where a proposed reform appeared unfavourable to their interests.

But these rôle preferences are not uniform. Planners considering educational innovation have often gained support from coalitions of teacher groups and local political leaders even when their colleagues at the centre oppose them, and *vice versa*. And international influences have often supported useful reforms whose value was not at first perceived at higher levels in an educational ministry. Even a single interest group can entertain conflicting political preferences in different regions. Such indirect interest-group effects merge with the decision-order rationalities in creating the political climate of educational reform.

Educational reform incorporates essentially political interactions even though professionals prefer to think of it in the neutral language of technological or economic analysis. The assessment of the bureaucratic and organizational consequences described here is as important to the success of educational reform as professional knowledge of the teaching and learning processes. Educational reform is a professional task, but it requires something of a politician's skill.

The little red schoolhouse has persisted for so many centuries, with its teacher-dominated, one-way flow of information, because that particular style of education serves the needs and convenience of the teachers so well, without depriving society of the values that education provides. Changing a system that has survived so long can be incremental only when a society is able to accomodate traditional interests without surrendering to them. The fact that all revolutionary systems have made drastic changes in education emphasizes its critical rôle in society. Education can change drastically without revolution, but the reverse is rarely true. No society can reform itself without reforming its education.

Appendix

Interaction among major decisions in an instructional television programme

Conditions in El Salvador appeared to favour a simple first-order decision as a resolution of the problems in the educational system. The size of the country and its general geographic features were favourable to the use of instructional television. There were the classical justifications for the use of the technology—high illiteracy and drop-out rates, insufficient school facilities, and the prohibitive costs of expanding the conventional system. These factors were recognized by the early 1960s, and the actual decision to move toward instructional television came in 1961, after Walter Beneke had served a tour of duty as ambassador to Japan and observed the successful uses of educational television in that country. He decided, on his own initiative, to request the assistance of the Japanese Broadcasting System, NHK, which agreed to analyze the technological feasibility of applying the Japanese approach in El Salvador.

The Ministry of Education resisted the proposals that emerged from that study in spite of support from the president, who had decided in 1964 to create a separate Department of Educational Television within the Ministry of Education. In 1965 Ambassador Beneke returned and immediately resumed his efforts to convince the Ministry of the utility of the approach. He and the Commission on Educational Television worked out a cost/benefit study of the technological feasibilities and reached a consensus that the project should begin at the middle school level (grades 7-9) because that was the element of the educational system that was performing most unsatisfactorily and the one that would have cost the greatest amount to renovate and expand.

Other favourable circumstances that pushed for the decision included the fortuitous presence of Unesco assistance in the form of training, advice, and technical co-operation in the field of instructional TV. Local commercial

channels could be used for the first tentative ventures in the field, to reduce overhead costs. The International Bank for Reconstruction and Development was favourably disposed to offer a loan in support of the venture, and such a loan was being negotiated when President Lyndon B. Johnson of the United States suddenly announced his intentions of offering major support to educational television in Latin America. This proposal stimulated immediate favourable action in both countries. Soon the American advisers were offering capital assistance faster and on a broader front than Dr. Beneke and his technicians thought feasible, and it was only because the plan for middle school beginnings had already been prepared that it was possible to persuade the sponsors to start with a more modest pilot venture.

The major 'second-order decision' that remained was where to locate the administrative unit charged with preparing the television instruction and operating the new programme. Salvadorans favoured a separate organization which would be able to move quickly through the president's office to get equipment and political support, and thus reduce resistance from the conservative leadership of the Ministry of Education. The American advisers believed that the Ministry of Education should house the new department so that it would have the greatest prospect for ending up as an integral part of the educational system. Again fortuitous circumstances brought events to a head in July 1967 when the president appointed former Ambassador Beneke as Minister of Education; no further arguments were necessary to bring about effective co-operation between the traditionalists and innovators in the Ministry of Education.

The greatest difficulties that lay ahead were in the area of motivation. Since El Salvador lacked qualified personnel in all phases of instructional television, the Ministry assigned personnel on the basis of their expressed interest and academic qualifications, producing only a random assortment of skilled staff in the teaching and technical positions. Since the technicians were considered by education ministry standards to be less qualified than the teachers they were paid less, in contrast to the arrangements in the commercial field; the salaries were adjusted only after the resulting resentment had led to a threatened strike. The trial-and-error method used for learning these jobs also produced some drop-outs and a frustrating lack of continuity. There were no incentives for either teachers or production personnel to produce quality lesson programmes; the only reward was for 'beating the schedule'. Even on the technical side, the section leaders in charge of production, utilization, and evaluation were competing for promotions to the post of sub-director of the Instructional Television Division, and these sections not only failed to collaborate, but actively interfered with the production schedules and collateral responsibilities for efficient operation. Only after a sub-director for the division had been appointed from outside was it possible for the department to achieve co-operative relationships among these three sections.

Enlisting the support of parents (who were concerned that television would damage their children's eyes) and teachers (who feared that television would replace their classroom roles) called for special public relations programmes, including sessions with teacher and parent groups. Special training for teachers in the use of television showed them ways in which the new system would enrich their role, without reducing their dominance of the educational process.

One of the principal features of this administrative history is the extent to which first-order decisions received the most rational attention and analysis, while it was second-order considerations that produced both the primary problems and their eventual resolution. The motivational and incentive issues were left essentially unexplored as elements of the subsystem. The leading edge of change was administrative; the vehicle was technological; the obstacles came from inadequate attention to incentives and motivation. The system, so many years in the planning stage, began production in September 1968, reached 32 pilot seventh-grade classes in February 1969, was extended to 219 seventh-grade classes in 1970, and by 1972 was reaching 1,179 seventh, eighth, and ninth-grade classes in 263 schools.

Any assessment of the effectiveness of the innovations must concede that although the cost was only 8.2¢ per student/hour (as contrasted with 11¢ per student/hour in the non-televised instruction), the fact was that ITV became not a *substitute* but a *complement* to regular instruction. The cost was not 8¢ an hour instead of 11¢ an hour, but 19¢ instead of 11¢. The Stanford team that carried out the assessment concluded that the learning gains for classes that enjoyed all elements of the innovation except television were statistically insignificant as compared with those that could be traced to the educational innovations with the television. The only major gain for the system as a whole was that the differential between rural and urban population learning gains was reduced when all elements of the system were present.

There was one respect in which first-order decisions were the leading edge of change: for the introduction of television brought about or encouraged the reorganization in the Ministry of Education that followed; made necessary extensive teacher retraining at the middle-school level; brought about curriculum revision and the development of new study materials; introduced new methods for supervising teachers and providing substantial feedback from their work; produced new schoolrooms; reduced and eliminated tuition in these grades; made use of double sessions and reduced hours to teach more pupils; and introduced new student evaluation systems as a means of gaining information about promotion and grading policies.

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